

Applicant : Andrew Ingle
Serial No. : 10/666,443
Filed : September 19, 2003
Page : 2 of 11

Attorney's Docket No.: 12406-154001 / P2003,0943 US
E

Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1. (Currently amended) An encapsulated organic electronic device, comprising:
a substrate;
an organic electronic device on said substrate;
~~an multiple epoxy seals on said substrate, said multiple epoxy seals surrounding~~
surrounds a perimeter of said organic electronic device; and
an encapsulation lid on said multiple epoxy seals, wherein:
~~said epoxy is a liquid or a gel when the epoxy is applied to said encapsulation lid~~
~~or said substrate, and~~
~~each of said multiple epoxy seals include includes~~ a desiccant, said desiccant is:
barium oxide, calcium oxide, magnesium oxide, cobalt chloride, calcium chloride, calcium bromide, lithium chloride, zinc chloride, zinc bromide, sodium molecular, silicon dioxide, aluminum oxide, calcium sulfate, copper sulfate, potassium carbonate, magnesium carbonate, titanium dioxide, bentonite, acidic clay, montmorillonite, diatomaceous earth silica alumina, zcolite, silica, zirconia, activated carbon, or a mixture thereof.
2. (Currently amended) The encapsulated organic electronic device of claim 1 wherein
~~said multiple epoxy seals bond bonds~~ said encapsulation lid to said substrate, and ~~absorb absorb~~
at least one of: oxygen ~~and or~~ moisture.
3. (Original) The encapsulated organic electronic device of claim 1 wherein an interior portion of said encapsulation lid does not have a cavity.

Applicant : Andrew Ingle
Serial No. : 10/666,443
Filed : September 19, 2003
Page : 3 of 11

Attorney's Docket No.: 12406-154001 / P2003,0943 US
E

4. (Currently amended) The encapsulated organic electronic device of claim 1 wherein said multiple epoxy seals are applied using a syringe needle or by screen printing.

5. (Currently amended) The encapsulated organic electronic device of claim 1 wherein said multiple epoxy seals further includes include an epoxy resin[,] and a hardener.

6. (Currently amended) The encapsulated organic electronic device of claim 5 wherein said multiple epoxy seals further includes include at least one filler.

7. (Previously Presented) The encapsulated organic electronic device of claim 1 wherein said desiccant is a finely particulated solid and an average particle size of said solid is less than 10 microns.

8. (Currently amended) The encapsulated organic electronic device of claim 1 wherein said multiple epoxy seals are cured only after said epoxy is applied on said encapsulation lid or said substrate.

9. (Original) The encapsulated organic electronic device of claim 1 wherein said organic electronic device is an OLED display, an OLED light source used for general purpose lighting, an organic transistor array, an organic light sensor array, an organic solar cell array, or an organic laser array.

10. (Withdrawn – currently amended) A method to encapsulate an organic electronic device, comprising:

fabricating said organic electronic device on a substrate;

applying an epoxy on an encapsulation lid or on said substrate such that when said encapsulation lid, said substrate, and said epoxy are brought together, said epoxy forms multiple epoxy seals is around surrounding a perimeter of said organic electronic device;

Applicant : Andrew Ingle
Serial No. : 10/666,443
Filed : September 19, 2003
Page : 4 of 11

Attorney's Docket No.: 12406-154001 / P2003,0943 US
E

depositing an encapsulation lid over said organic electronic device such that said epoxy contacts both said substrate and said encapsulation lid to encapsulate said organic electronic device; and

curing said epoxy, wherein said epoxy is a liquid or a gel when it is applied to said encapsulation lid or said substrate, and said epoxy includes a desiccant, said desiccant is: barium oxide, calcium oxide, magnesium oxide, cobalt chloride, calcium chloride, calcium bromide, lithium chloride, zinc chloride, zinc bromide, sodium molevular, silicon dioxide, aluminum oxide, calcium sulfate, copper sulfate, potassium carbonate, magnesium carbonate, titanium dioxide, bentonite, acidic clay, montmorillonite, diatomaceous earth silica alumina, zeolite, silica, zirconia, activated carbon, or a mixture thereof.

11. (Withdrawn – currently amended) The method of claim 10 wherein said epoxy bonds said encapsulation lid to said substrate, and absorbs at least one of: oxygen and or moisture.

12. (Withdrawn) The method of claim 10 wherein an interior portion of said encapsulation lid does not have a cavity.

13. (Withdrawn – currently amended) The method of claim 10 further comprising shaping said epoxy as said epoxy is applied on said encapsulation lid or on said substrate such that when said encapsulation lid, said substrate, and said epoxy are brought together, said multiple epoxy seals are is around a perimeter of said organic electronic device.

14. (Withdrawn) The method of claim 10 wherein said epoxy is applied using a syringe needle or by screen printing.

15. (Withdrawn) The method of claim 10 further comprising, prior to applying said epoxy, forming said epoxy by mixing said desiccant with an epoxy resin to form a solution and then mixing said solution with a hardener to form said epoxy.

Applicant : Andrew Ingle
Serial No. : 10/666,443
Filed : September 19, 2003
Page : 5 of 11

Attorney's Docket No.: 12406-154001 / P2003,0943 US
E

16. (Withdrawn) The method of claim 10 further comprising, prior to applying said epoxy, forming said epoxy by mixing said desiccant, an epoxy resin, a hardener, and a UV-catalyst to form said epoxy.

17. (Withdrawn) The method of claim 10 further comprising, prior to applying said epoxy, grinding said desiccant into a plurality of particles with a high surface area, wherein an average particle size of said plurality of particles is less than 10 microns.

18. (Withdrawn) The method of claim 10 wherein said epoxy is cured only after it is applied on said encapsulation lid or said substrate.

19. (Withdrawn – currently amended) The method of claim 10 wherein a shape of said multiple epoxy seals are formed as said epoxy is applied to said encapsulation lid or said substrate.

20. (Withdrawn) The method of claim 10 wherein said organic electronic device is an OLED display, an OLED light source used for general purpose lighting, an organic transistor array, an organic light sensor array, an organic solar cell array, or an organic laser array.

21. (Currently amended) An encapsulated organic electronic device, comprising:
a substrate;
an organic electronic device on said substrate;
a desiccant ring on said substrate, said desiccant ring surrounds a perimeter of said organic electronic device;
an epoxy on said substrate, said epoxy surrounds a perimeter of said desiccant ring; and
~~an encapsulation lid on said epoxy, wherein said desiccant ring is made~~ consists of a reactive ~~an alkali metal or an alkaline earth metal or a reactive oxide~~ and said epoxy is a liquid or gel when the epoxy is applied.

Applicant : Andrew Ingle
Serial No. : 10/666,443
Filed : September 19, 2003
Page : 6 of 11

Attorney's Docket No.: 12406-154001 / P2003,0943 US
E

22. (Original) The encapsulated organic electronic device of claim 21 wherein said desiccant ring is comprised of barium or calcium.

23. (Original) The encapsulated organic electronic device of claim 21 wherein said desiccant ring absorbs at least one of oxygen and moisture.

24. (Original) The encapsulated organic electronic device of claim 21 wherein a height of said desiccant ring has a range between 300 nm to 1 micron.

25. (Cancelled)

26. (Currently amended) The encapsulated organic electronic device of claim 21 wherein said epoxy absorbs at least one of: oxygen and or moisture.

27. (Previously Presented) The encapsulated organic electronic device of claim 26 wherein said epoxy includes a desiccant, said desiccant is: barium oxide, calcium oxide, magnesium oxide, cobalt chloride, calcium chloride, calcium bromide, lithium chloride, zinc chloride, zinc bromide, sodium molecular, silicon dioxide, aluminum oxide, calcium sulfate, copper sulfate, potassium carbonate, magnesium carbonate, titanium dioxide, bentonite, acidic clay, montmorillonite, diatomaceous earth silica alumina, zeolite, silica, zirconia, activated carbon, or a mixture thereof.

28. (Original) The encapsulated organic electronic device of claim 21 wherein an interior portion of said encapsulation lid does not have a cavity.

29. (Original) The encapsulated organic electronic device of claim 21 wherein said organic electronic device is an OLED display, an OLED light source used for general purpose lighting, an organic transistor array, an organic light sensor array, an organic solar cell array, or an organic laser array.

Applicant : Andrew Ingle
Serial No. : 10/666,443
Filed : September 19, 2003
Page : 7 of 11

Attorney's Docket No.: 12406-154001 / P2003,0943 US
E

30. (Withdrawn – currently amended) A method to encapsulate an organic electronic device, comprising:

 fabricating said organic electronic device on a substrate;

 evaporating an desiccant ring on an encapsulation lid such that when said substrate, said encapsulation lid, and an epoxy are brought together, said desiccant ring is around a perimeter of said organic electronic device;

 applying an epoxy on said encapsulation lid or on said substrate such that when said substrate, said encapsulation lid, and said epoxy are brought together, said epoxy is around a perimeter of said desiccant ring; and

 depositing an encapsulation lid over said organic electronic device such that said epoxy contacts both said substrate and said encapsulation lid to encapsulate said organic electronic device, wherein said desiccant ring is ~~made of: an alkali metal or an alkaline earth metal~~ consists of a reactive metal or reactive oxide.

31. (Withdrawn) The method of claim 30 wherein said desiccant ring is comprised of barium or calcium.

32. (Withdrawn – currently amended) The method of claim 30 wherein said desiccant ring absorbs at least one of: oxygen and or moisture.

33. (Withdrawn) The method of claim 30 wherein a height of said desiccant ring has a range between 300 nm to 1 micron.

34. (Withdrawn) The method of claim 30 wherein said epoxy includes a desiccant, said desiccant is: barium oxide, calcium oxide, magnesium oxide, cobalt chloride, calcium chloride, calcium bromide, lithium chloride, zinc chloride, zinc bromide, sodium molybdate, silicon dioxide, aluminum oxide, calcium sulfate, copper sulfate, potassium carbonate, magnesium carbonate, titanium dioxide, bentonite, acidic clay, montmorillonite, diatomaceous earth silica alumina, zeolite, silica, zirconia, activated carbon, or a mixture thereof.

Applicant : Andrew Ingle
Serial No. : 10/666,443
Filed : September 19, 2003
Page : 8 of 11

Attorney's Docket No.: 12406-154001 / P2003,0943 US
E

35. (Previously Presented) The encapsulated organic electronic device of claim 21 wherein the epoxy is a liquid when applied.

36. (Currently amended) The encapsulated organic electronic device of claim 1 wherein the multiple epoxy seals ~~are~~ is a liquid when applied.

37. (New) The encapsulated organic electronic device of claim 21 wherein the desiccant ring consists of an alkali metal or an alkaline-earth metal.

38. (New) The encapsulated organic electronic device of claim 21 wherein the multiple epoxy seals are gel when applied.

39. (New) The encapsulated organic electronic device of claim 1 wherein all of the multiple epoxy seals are UV-curable.

40. (New) The encapsulated organic electronic device of claim 1 wherein the all of the multiple epoxy seals are thermal-curable.

41. (New) The encapsulated organic electronic device of claim 1 wherein the some of the multiple epoxy seals are thermal-curable and some of the multiple epoxy seals are UV-curable.

42. (New) The encapsulated organic electronic device of claim 1 wherein the multiple epoxy seals are gel when applied.